

Jefferson Lab

Proposal Cover Sheet (Generic)

Experimental Hall: A
Days Requested for Approval: _____

Submission Date: 5/24/94
Other: PAC 8

☐ New Proposal Title:

☒ Update Experiment Number: 91-026

☐ Letter-of-Intent Title:

(Choose one)

Proposal Physics Goals

Indicate any experiments that have physics goals similar to those in your proposal.

Approved, Conditionally Approved, and/or Deferred Experiment(s) or proposals:

Contact Person

Name: G.G. Petratos

Institution: Kent State University

Address: Dept of Physics

Address:

City, State, ZIP/Country: Kent, OH 44242

Phone:

Fax:

E-Mail: gpetrato@kent.edu

Receipt Date: 5/94

By: _____

Jefferson Lab Use Only

PR-94-031

May 1994 Update

CEBAF EXPERIMENT 91-26

Measurement of the Electric and Magnetic Elastic
Structure Functions of the Deuteron at Large Q^2

Hall-A Collaboration

Spokesperson: G.G. Petratos, Kent State University

This experiment was proposed to the CEBAF PAC5 in 1991 by a few Institutions. It was partially approved for 21 days of beam time. Since that time it has become a Hall-A Collaboration experiment.

The objectives of the approved part of the proposal, as presented to the PAC5, are:

- To measure the electric form-factor $A(Q^2)$ of the deuteron at the highest possible Q^2 .
- To provide precise data on $A(Q^2)$ at low Q^2 in order to resolve an apparent disagreement between existing SLAC data and data from Saclay/Bonn/CEA.
- Improve the quality of existing data on the magnetic form-factor $B(Q^2)$ up to $Q^2 = 1.4 \text{ (GeV/c)}^2$.

It should be noted that the part of the proposal aiming at the measurement of $B(Q^2)$ at large momentum transfers with a special 180° spectrometer has been deferred ("not to be approved at this time").

The experiment relies on a coincidence measurement using both the electron and hadron High Resolution Spectrometers of Hall-A with their standard detector packages, presently under development and on schedule. The high resolution aspect of the spectrometers is not required for this experiment.

The experiment requires the high power liquid hydrogen/deuterium target of Hall-A, which at this time remains partially unfunded. Despite these funding limitations, a significant amount of work has been done by the California State University at Los Angeles group and the Hall-A staff in the design and construction of parts of the cryotarget (see report of Hall-A Experiment Integration Committee).

There exists a detailed Monte Carlo simulation program for the experiment, necessary for the calculation of the double-arm solid angle. The program will constitute the basis of the on-line and off-line data analysis package.

The physics goals of the experiment remain unchanged (as does the intent of the proponents for a good measurement of the magnetic form-factor at large Q^2 with a dedicated 180° spectrometer or a 3rd spectrometer arm suitably converted to an 180° arm).